

EUPHORBIA SPECIES FROM THE FLORA ZAMBESIACA AREA: 10

L. C. LEACH

ABSTRACT

In this, the tenth in the series, three new species of *Euphorbia* are described; *E. mlanjeana*, from Malawi; *E. fanshawei*, from northern Zambia and *E. decliviticola* from northern Mozambique, and their apparent relationships discussed. *Euphorbia johnsonii* is reduced to subspecific rank in *E. knuthii*, which has a distribution in Mozambique, Transvaal and Natal.

UITTREKSEL

EUPHORBIA SOORTE VAN DIE FLORA ZAMBESIACA AREA: X

In hierdie, die tiende van die reeks, word drie nuwe *Euphorbia* soorte beskryf; *E. mlanjeana* vanaf Malawi; *E. fanshawei* vanaf Noord-Zambia en *E. decliviticola* vanaf Noord-Mosambiek en hulle skynbare verwantskap word bespreek. *Euphorbia johnsonii* word verlaag tot 'n subspesie van *E. knuthii* wat in Mosambiek, Transvaal en Natal voorkom.

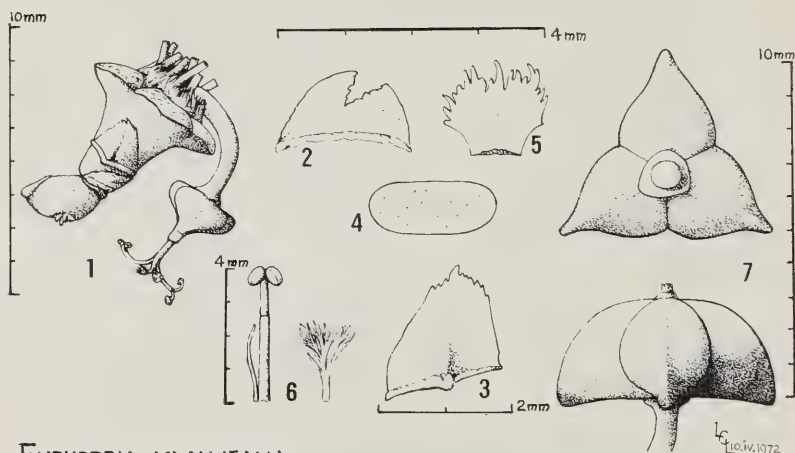
Previous articles in this series have appeared in Jl S. Afr. Bot. **30**: 1-12, 209-217 (1964); **31**: 241-249 (1965); **32**: 173-182 (1966); **33**: 247-262 (1967); **35**: 13-23 (1969); **36**: 13-52 (1970); and in Kirkia **4**: 15-23 (1964); **6**: 133-145 (1968).

Euphorbia mlanjeana Leach, sp. nov.; *E. graniticolae* Leach affinis sed planta parviore; ramis gracilioribus brevioribus, segmentis plerumque longioribus 3-6 alatis, alis tenuioribus podariis spinisque debilibus, podariis plerumque separatis; foliis parvissimis; inflorescentia unicymosa, cyma horizontaliter disposita distinctissima.

Frutex arboreus, succulentus, spinosus, acaulescens vel trunco brevi, crasso, cylindrico, nudo, griseo vel saepe ignibus denigrato, ramis confertis, fere rectis vel leviter curvatis patenti-ascendentibus apice coronato, usque ad 1 m altus (plerumque brevior), in locis praecipitibus crescens. *Rami* usque ad 0.6 m longi, plerumque breviores, c. 3 cm diam., interdum in segmenta proportionem longa leviter constricti, 3-5(6)-alati; alis usque ad 1,2 cm latis, 1,5-2 mm crassis, margine sinuato podariis spinisque infirme armato; *podaria* decurrentia initio separata demum plerumque fere vel satis confluentia; *spinae* binae valde divaricatae, horizontaliter patulae, 4-4,5 mm longae, 6-12 mm (plerumque plus minusve regulariter 10 mm) secus angulos distantes. *Folia* sessilia linearia vel anguste-ovata, acuta, 3-4 mm longa, plus minusve 1 mm lata, mox decidua; cicatrice plus minusve circulari, spinulis binis rudimentalibus late dispositis. *Inflorescentia* glabra, flava, unicymosa, plus minusve 2 mm supra spinas inserta; cyma pedunculata, pedunculo brevissimo, bibracteato; bractae parvissimae squamiformes; cyathii 3 horizontaliter dispositi; cyathium medium masculinum mox deciduum; cyathia lateralia bisexualia in cymarum ramis brevibus

Accepted for publication 25th May, 1972.

portata. *Involucrum* plus minusve obconicum, c. 2,5 mm longum, 4-4,5 mm diam.; *glandulis* 5, carnosus, valde patulis, contiguis, transverse oblongis, 1,5-2 mm $\times$ 0,75 mm, flavis, superficie leviter foveolato-rugulosa; *lobis* 5, plus minusve obovatis c. 1,6 mm latis, 1,4 mm longis, irregulariter fimbriatis paulo bilobatis vel emarginatis. *Flores masculini* c. 15, 5-fasciculati, bracteolis filiformibus vel filiformi-fimbriatis; *pedicelli* 2,5-3 mm longi; *filamenta* c. 1,25 mm longa. *Ovarium* plus minusve triangulare basi truncatum, ex involucrio pedicello curvato exsertum; *ovulum* obturamento cuculliformi, paulo bilobato, minute dentato suspensum. *Styli* c. 2,25 mm longi graciles, in columnam c. 1,25 mm connati, partibus libris valde patulis fere rectis, apicibus breviter bilobatis capitatis, granuloso-rugulosis. *Capsula* 3-lobata, plus minusve triangularis basi truncata apice parum rotundata, 6-7 mm inter angulos, c. 3 mm alta, longe ex involucrio exserta; *pedicello* initio valde recurvato demum erecto, usque ad 8 mm longo, basi c. 1 mm diam. apicem versus gradatim decrecenti ad c. 0,5 mm diam.; *perianthio* rudimentali, obtuse triangulari, c. 1 mm diam. *Semen* subglobosum, c. 2 $\times$ 2,25 mm, laeve, brunneum; sutura angusta leviter prominenti.



EUPHORBIA MLANJEANA

FIG. 1.

- (1) Cyathium (2) Bract subtending cyme branch (3) Involucral bract (4) Involucral gland (5) Involucral lobe (6) Male flower, bracteole and fascicular bract (7) Capsule

Typus: MALAWI, Mlanje Mountain, Leach et al 14805 (K; LISC; PRE; SRGH, holo.).

Malawi. S: Mlanje Mountain, steep exposed slopes above Little Malosa Riv., near the entrance to "The Crater", st. 15.viii.1971, Leach et al 14805 (K;

LISC; PRE; SRGH); idem, cuttings cult. Salisbury, fl. 30.x.1971, *Leach* 14805A (K; LISC; PRE; SRGH); ibid. fr. Jan. 1972, *J. & M. Royle* in *Leach* 14805B (BR; K; LISC; PRE; SRGH); slopes above Ruu gorge, Lujeri Tea Estate, st. 17.viii.1971, *Leach et al* 14823 (BR; FHO; K; MAL; SRGH), ibid. seedlings, 14823A (K; SRGH).



FIG. 2.

Plant at type locality above Little Malosa River lower slopes of Mlanje Mountain.
Euphorbia mlanjeana *Leach et al* 14805

E. mlanjeana appears to be restricted to exposed precipitous granite slopes above river gorges on the lower slopes of Mlanje Mountain, among grasses and vellozia. It appears to be most closely related to *E. graniticola* among the species presently known, although differing therefrom in several important respects.

The shorter, more slender, relatively long-segmented, 3-6-winged branches of the new species, which appear to persist at most for only a few seasons, are very different from those of its relative; while the thin wings armed with weak spines arising from small, usually separate spine shields contrast quite sharply with the more strongly armed and continuously margined, stout branches of the more southerly species, which are known (from plants in cultivation) to

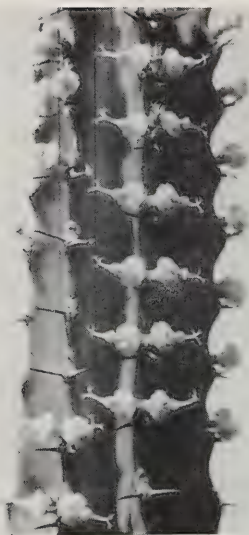


FIG. 3.
Cutting at early flowering stage

Euphorbia mlanjeana

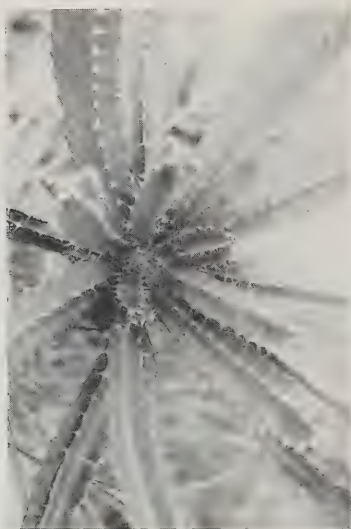


FIG. 4.
Apex of trunk, showing central
development of branches
Leach et al 14805

persist for at least 15 seasons. However, it is probably in the arrangement of the inflorescence that the most significant divergence occurs: that of *E. graniticola* comprises 1–3 cymes, each of three vertically arranged cyathia, as opposed to the more simple arrangement of a single cyme of three horizontally arranged cyathia which is characteristic of the new species.

There are other less important differences between the two taxa, e.g. the generally smaller stature of the Malawian plants and their much shorter leaves. However, a similarity in their manner of growth seems to be worthy of mention; on first sight Mr. Whellan described this as being similar to that of *E. decidua* Bally & Leach (a tuberous-rooted species with annual spiny branches arising from a single crown), and the simile is by no means inappropriate, especially when the trunks of *E. mlanjeana* have been almost stripped of their branches by grass fires (which appear to be frequent). New branches arise from the centre of the crown in exactly the same fashion as is normally met in some of the tuberous-rooted species; and the same arrangement, although less marked, is to be seen in *E. graniticola* but not in the related *E. decliviticola* Leach (described elsewhere in this paper). This is one of several reasons why *E. mlanjeana* is considered to be more closely related to the former, despite the latter's geo-

graphical proximity; another being the more nearly similar capsule shape of the more southerly species.



FIG. 5.

Unusual branched plant, Ruu Gorge, above Lujeri Tea Estate. *Leach et al* 14823
Euphorbia mlanjeana

On the rock slopes inhabited by *E. mlanjeana* the development of a below-ground stem would be impossible; it will be interesting, therefore, to see if seedling plants now in cultivation on deeper soils will maintain the trunk-forming habit or whether they will develop an underground stem, which would somehow seem to be more in conformity with their manner of growth.

In his "The Vegetation of Mlanje Mountains" (1962), J. D. Chapman mentions a small, candelabra-type euphorbia which is represented by his gathering No. 312. This specimen differs in several respects from the species now described; e.g. the inflorescence is of the pattern with three vertically-arranged cymes. This is, unfortunately, insufficiently developed for identification.

It seems, therefore, that there are two euphorbias, of somewhat similar appearance, growing on Mlanje Mountain and it is hoped to make the second of these the subject of further investigation as it does not appear to belong in any of the currently known species from this part of Africa.

Plant: a succulent, spiny, often tree-like, small shrub, up to ± 1 m high (usually shorter), acaulous or with a short (seldom attaining 0,5 m in height), stout (± 10 cm diam.), cylindric, nude trunk, grey or frequently blackened by grass fires; with a crown of crowded, almost straight or slightly curved, spreading, ascending branches. *Branches* up to 0,6 m long (generally less), ± 3 cm diam., narrowing towards the base, sometimes slightly constricted into 2–3 relatively long segments; 3–5(6)-winged, with thin wings up to 1,2 cm wide, 1,5–2 mm thick at the weakly-armed sinuate toothed margin and scarcely thicker at their junction with the small central core. *Spines* in pairs, widely divergent ($\pm 120^\circ$ – 170°), horizontally spreading, of remarkably uniform length (when fully developed), 4–4,5 mm long, 6–12 mm, mostly more or less regularly ± 10 mm apart along the angles; *spine shields* initially separate, decurrent to an acute point below and similarly produced above to include the flowering eye ± 2 mm above the spine pairs, usually becoming confluent into a continuous or sub-continuous horny grey margin with age. *Leaves* sessile, linear or narrowly ovate, acute, 3–4 mm long, ± 1 mm wide, caducous, leaving a $\pm$ circular scar flanked by a pair of widely-spaced, often obsolescent, rudimentary prickles. *Inflorescence* glabrous, yellow, comprising a single, very shortly pedunculate cyme of three horizontally arranged cyathia; *peduncle* bibracteate, with very small, scale-like bracts subtending the short cyme branches; the initial, central cyathium male, deciduous, and the lateral cyathia bisexual. *Involucre* more or less obconic, $\pm 2,5$ mm long, 4–4,5 mm diam.; *glands* 5, fleshy, widely spreading, contiguous, transversely oblong 1,5–2 mm $\times$ 0,75 mm, yellow, with the upper surface pitted rugulose; *lobes* 5, more or less obovate, $\pm 1,6$ mm wide $\times$ 1,4 mm long, irregularly fimbriate, slightly 2-lobed or emarginate. *Male flowers* $\pm 1,5$, arranged in five fascicles with filiform or filiform-fimbriate bracteoles; *pedicels* 2,5–3 mm long; *filaments* $\pm 1,25$ mm long. *Ovary* more or less triangular, truncate at the base, exserted from the involucre on a curved pedicel; ovule suspended under a minute, hood-shaped, somewhat 2-lobed, minutely denticulate obturator. *Styles* $\pm 2,25$ mm long, slender, united into a column $\pm 1,25$ mm long, with the free portions widely spreading, almost straight, with the capitate apices shortly 2-lobed and granulate rugose stigmas. *Capsule* 3-lobed, more or less triangular with the base sharply truncate and the apex somewhat rounded, 6–7 mm across the angles, ± 3 mm high, far exserted from the involucre; *pedicel* initially strongly recurved, becoming straight and erect shortly before dehiscence, up to 8 mm long, ± 1 mm diam. at the base tapering gradually to the $\pm 0,5$ mm diam. apex; *perianth* rudimentary, obtusely triangular, ± 1 mm diam. *Seed* subglobose, $\pm 2 \times 2,25$ mm, smooth, brown with a narrow slightly-raised suture.

***Euphorbia fanshawei* Leach, sp. nov.**

E. decidua Bally & Leach arcte affinis sed ramis prominentissime tuberculato-

dentatis; inflorescentia brevissime pedunculata, semper in ramis portata nunquam caudice exorienti; bracteis parvissimis; involucri proportionem brevioris lobisque latioribus brevius fimbriatis; perianthio valde dentato-trilobato bene distincta.

Herba pumila perennis; ramis succulentis, spinosis. *Radix* tuberosa, nappiformis vel sphaeroidea. *Caulis* redactus, hypogaeus radici coalescens. *Rami* caudicis ab apice radiantes, plerumque numerosi, simplices, aliquantum clavati, initio patenti-erecti, demum flaccidi saepe decumbentes, usque ad 12,5 cm longi, (4)5–6-angulati, prominentissime tuberculato-dentati; *dentibus* carnosus usque ad 7 mm altis (basin versus decrescentibus), secus angulos instructi. *Dentes* scutulo badio, superficiali, plus minusve sub-quadrato, bispinoso muniti; *spinis* binis, divergentibus, basibus inflatis e scutulo procurrentibus, late patentibus rarissime deflexis, usque ad 4 mm longis (plerumque brevioribus). *Folia* carnosae, erecta, subconcoidea, acuta, ad 2,5 mm longa, super scutulum prodientes; aculeo in quoque latere instructa. *Inflorescentia* axillaris, saepe cyathio bisexuali solitario, breviter pedunculato, interdum cymosa pedunculo usque ad 5 mm longo; cyathio initio masculo marcescenti cyathiisque lateralibus bisexualibus in ramis usque ad 4 mm longis portatis, raro cyathiis lateralibus secundariis prodientibus; cymae ramis bractea squamiformi parvissima subtentis. *Cyathium* glabrum plus minusve late turbinatum, c. 2–2,5 mm longum, usque ad 5 mm diam.; *glandulis* 5, carnosae, patulis, transverse oblongis, contiguis, leviter convexis, flavis, foveolatis, c. 2–2,25 mm × 1 mm; *lobis* 5, imbricatis, plus minusve transverse late ellipticis irregulariter fimbriatodentatis, basin versus leviter carnosae, c. 1 mm longis, ad 2 mm latis; *bracteis* squamiformibus, ad apicem minute denticulatis, c. 1 mm longe lateque. *Flores masculi* c. 20, bracteolis filiformibus 5-fasciculatis; fasciculis unusquisque bractea subtiliter filiformis vel plumoso-lobata instructis; *pedicelli* c. 2,5 mm longi; filamenta c. 1 mm longa. *Ovarium* pedicello recurvato longe exsertum; *ovulum* laeve ecarunculatum, obturamento minute denticulato suspensum; *styli* 3–3,5 mm longi in columnam breviter connati, patuli, apicibus rugulosis, capitatis aut emarginatis aut breviter bilobatis. *Capsula* fere maturescens, 3-lobata, angulis subacutis, in sinibus manifeste costata, c. 3 mm diam., 2,25 mm alta; *perianthio* profunde dentato-trilobato, c. 2,25 mm inter apices loborum. *Semen* maturum non visum.

Typus: ZAMBIA, Kawambwa Distr., Williamson & Drummond 1985A (BR; K; SRGH, holo.).

Zambia. N; Northern Prov., Kawambwa Distr., immature ♂ fl., 24.viii.1957, Fanshawe F3590 (NDO); ±16 km W of Kawambwa, ±9° 52' S; 28° 55' E, in sandy soil on quartzite outcrop in *Brachystegia* woodland, near river above Ntumbachushi Falls, st. 24.xii.1967, Williamson & Simon 726 (PRE), idem cult. SRGH, fl. 10.vi.1970, 726A (SRGH); ibid. st. 27.ii.1970, Williamson & Drum-

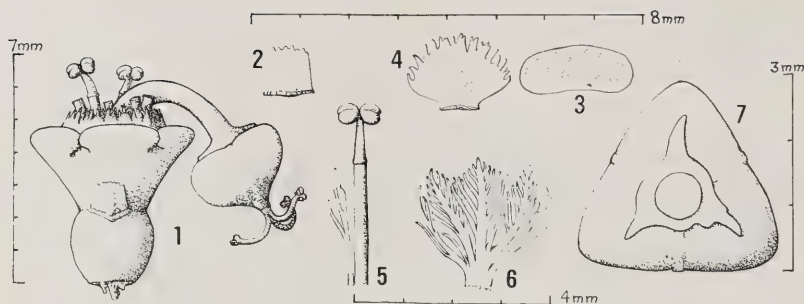


FIG. 6.

1. Cyathium 2. Involucral bract 3. Involucral gland 4. Involucral lobe
5. Male flower with bracteole 6. Fascicular bract 7. Capsule (nearly fully developed).
***Euphorhorbia fanshawei* Leach**

mond 1985 (G; SRGH), idem cult. SRGH, fl. 10.iv.1972, 1985A (BR; K; SRGH).

This interesting new species appears to be very closely related to the comparatively widespread *E. decidua* but nevertheless differs in a number of characters; the most obvious among these being its more prominently tuberculate toothed branches. The inflorescence of *E. fanshawei*, unlike that of its relative, is developed only on these branches, which appear to persist under natural conditions for more than a full season; with the inflorescence appearing quite late in the growing cycle, e.g. *Fanshawe* F3590, which is at an early stage of flowering in late August.

That the hysteranthous habit of *E. decidua* has developed in response to the drier conditions in which it grows seems evident from the fact that under presumable abnormal conditions of water availability in cultivation, this species sometimes produces an inflorescence on its branches, similar in all essentials but additional to that arising direct from the caudex. This trait, although not unknown even under natural conditions among other geophytes of the tribe, e.g. *E. trichadenia* Pax, has never been observed in plants of *E. fanshawei* in cultivation. Individuals of this latter species, when subjected to conditions of dryness approaching those under which *E. decidua* normally grows, usually die or occasionally produce an inflorescence on very young undeveloped new branches; a response in all ways similar to, yet falling far short of that developed in *E. decidua*. There are other important differences which include the shorter peduncle of the new species (the longest seen being shorter than the shortest seen in *E. decidua*) and its proportionally shorter involucre with wider, less deeply fimbriate lobes and a deeply lobed, much larger perianth; while the very much smaller bracts of the inflorescence of *E. fanshawei* appear to be infallibly



FIG. 7A.

Young plant showing leaves and spinescence *Williamson & Drummond 1985A*

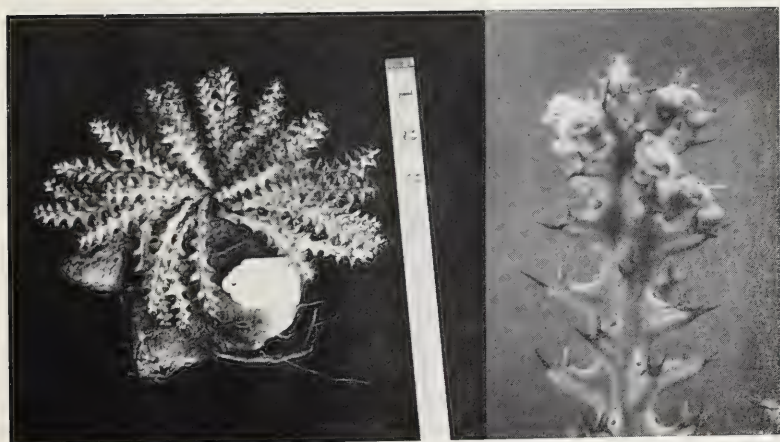


FIG. 7B.

Mature plant with flattened tuber
Williamson & Drummond 1985

Flowering branch
1985A

Euphorbia fanshawei

diagnostic. There are also several minor differences, such as the set of the paired spines which in the Kawambwa plants are usually horizontally spreading or somewhat ascending, as opposed to the generally more or less deflexed spine pairs of *E. decidua* which are also usually more widely divergent; while the anthers of the new species are, in the material seen, noticeably smaller than those of its relative.

The distribution of *E. fanshawei* as presently known appears to be restricted to a limited area in the vicinity of Ntumbachushi Falls, some 16 km to the west of Kawambwa in the Northern Province of Zambia. Here plants are fairly plentiful, growing in very humid conditions on shallow quartzitic soil in woodland shade; a habitat which it shares with *E. williamsonii* Leach, which is also, as far as is known, endemic to the same area.

Plant: a dwarf perennial herb with a turnip-shaped or more or less oblate tuberous root, with succulent spiny branches radiating from the apex of the much reduced, subterranean stem which merges imperceptibly with the root. *Branches* usually numerous, simple, somewhat clavate, initially erectly spreading, becoming flaccid and often decumbent with age, up to 12,5 cm long, (4)5-6-angled, with prominent fleshy tubercle teeth up to 7 mm high (becoming smaller towards the base) along the angles. *Spines* in widely spreading or somewhat ascending (very rarely deflexed) divergent pairs, up to 4 mm long (usually shorter), with inflated bases, extended from the outer margin of the dark or reddish brown, subquadrate *spine shield* on the upper surface at the apex of the tubercle teeth. *Leaves* fleshy, subconical, acute, erect, up to 2,5 mm long, quite or nearly touching the spine shield, which extending on each side of the leaf base but not enclosing it carries the pair of prickles, which initially touching the leaf base become somewhat distant as the spine shield develops. *Inflorescence* axillary, sometimes cymose or often comprising a shortly pedunculate, solitary, bisexual cyathium; when cymose, with a peduncle up to 5 mm long and the initial cyathium male, marcescent, with the lateral bisexual cyathia borne on cyme branches up to 4 mm long, less frequently with secondary lateral cyathia developing on each side of the first; cyme branches subtended at their base by a very small scale-like bract. *Cyathium* glabrous, more or less broadly obconical, $\pm 2-2,5$ mm long, 5 mm diam.; *glands* 5, fleshy, spreading, transversely oblong, $\pm 2-2,5$ mm $\times$ 1 mm, contiguous, yellow on their slightly convex, pitted upper surface; *lobes* 5, imbricate, more or less transversely broadly elliptic, ± 2 mm wide, 1 mm long, irregularly fimbriate toothed, slightly fleshy towards the base; *involucral bracts* scale-like, minutely toothed at the apex, ± 1 mm long and wide. *Male flowers* ± 20 , with filiform bracteoles, arranged in 5 fascicles, each with a finely filiform-divided or plumose lobed inner bract; *pedicels* $\pm 2,5$ mm long; *filaments* ± 1 mm long. *Ovary* far exserted on a recurved fleshy pedicel; *ovule* smooth, without a caruncle, suspended under a minutely denticulately fringed

obturator; styles 3–3,5 mm long, shortly united at their base, with the free portions widely spreading, with capitate or emarginate, or sometimes shortly bilobed, rugulose apices. Capsule nearing maturity, 3-lobed with subacute angles, distinctly ribbed in the sinuses, ± 3 mm diam., 2,25 mm high; perianth dentate, deeply 3-lobed, $\pm 2,25$ mm across the apices of the lobes. Fully mature capsule and seed not seen.

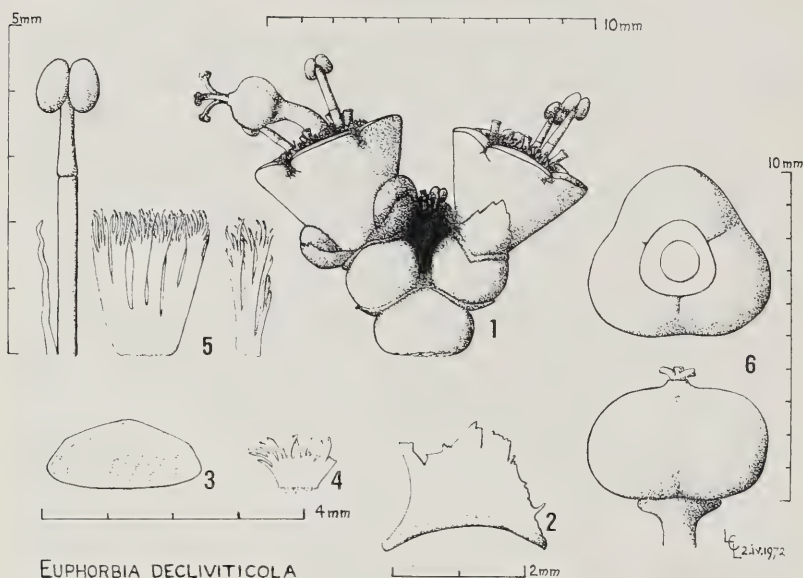
***Euphorbia declivicola* Leach, sp. nov.**

E. graniticola Leach arcte affinis sed planta semper caulescenti, ramis verticillatis, florescentia aestivali; inflorescentia cymis cyathiisque temere dispositis; involucri lobis fere duplo latioribus et florum masculorum fasciculis bractea lata laciniata interne subtentis; capsula fere subglobosa differt.

Arbuscula succulenta, spinosa, usque ad 3 m alta, caulescens; *trunco* crasso, demum multi-angulato, ramorum verticillatum delapsum cicatricibus cingenti-notato; ramis persaepe simplicibus verticillatim arcte contiguis coronato. *Rami* patentes arcuato-ascendentes, 4–6-angulati, c. 0,6 m longi, in segmenta constricti, segmentis 2,5–15 cm longis, angulis alatis, alis 2–2,5 cm latis, albo-marginatis; margo corneus, continuus, 1,5–3 mm latus. *Spinae* binae divaricatae plus minusve horizontaliter patulae, usque ad c. 6 mm longae. *Folia* sessilia, carnosa, caduca, ovata vel anguste ovata, acuta, usque ad 7 mm longa; foliorum cicatricibus subcircularibus vel late obovatis mox inconspicuis spinulisque obsolescentibus. *Inflorescentia* cymosa, cymis 1–3 brevissime pedunculatis temere dispositis, unaquibisque initio cyathiis 3 temere (frequenter horizontaliter vel oblique) dispositis; cyathio medio masculo sessili deciduo, cyathiis lateralibus bisexualibus, plerumque cyathiis bisexualibus secundariis bractearum axillis exorientibus, interdum cyathiis bisexualibus itidem crebro effectis. *Pedunculus* bracteatus, c. 2 mm longus $\times$ 3 mm crassus, bracteis plus minusve lunatis plerumque scissis; cymarum ramis c. 2 mm longis, bracteis binis initio plus minusve ovatis, minute denticulatis mox laceratis. *Involucrum* glabrum, truncato-obconicum 2,5–3,25 mm longum, plerumque c. 4,5–5 mm diam.; *glandulis* 5, carnosae, separatis vel fere contiguis, plus minusve depresso obovatis, 1,75–2,5 mm latis $\times$ c. 1 mm, leviter convexis, sparse leviter rugulosae, peranguste laevi-marginatis, flavis; *lobis* 5, subquadratis vel transverse oblongis, usque ad 1,75 mm latis, profunde fimbriatis. *Flores masculi* c. 30, bracteolis filiformibus vel filiformi-laceratis, 5-fasciculati; fasciculis unusquisque bractea lata laciniata apice subtiliter filiformi-lacerata interne subtentis; *pedicelli* c. 3 mm longi; *filamenta* c. 1,5 mm longa. *Ovarium* subglobosum pedicello curvato exsertum; ovulum obturamento minimo sublobato dependens; *styli* c. 1 mm longi, libri fere ad basim, patuli, apice brevissime bilobati. *Capsula* obtuse trilobata, fere subglobosa, 5–5,5 mm diam., 3–3,5 mm alta ubi plus minusve matura; pedicello usque ad 7 mm longo, perianthio obtuse triangulari vel fere subcirculari, usque ad 2,5 mm diam. *Semen* globosum c. 2 mm diam. laeve.

Typus: MOÇAMBIQUE, Moçambique Distr., *Leach & Schelpe* 11427 (K; LISC; PRE; SRGH, *holo.*).

Moçambique. N: Moçambique Distr., ± 18 km E of Namina, st. 23.v.1961, *Leach & Rutherford Smith* 10976 (K; LISC; PRE; SRGH); $\pm 2,5$ km S of Posta Agricola, Ribaué, cult. Nelspruit, fl. & fr. Nov. 1969–Jan. 1970, *Leach & Schelpe* 11427 (K; LISC; PRE; SRGH).



EUPHORBIA DECLIVITICOLA

FIG. 8.

1. Cyme with lateral bisexual cyathia 2. Bract subtending cyme branch 3. Involucral gland 4. Involucral lobe 5. Male flower with bract and bracteoles 6. Capsule in elevation and plan

Euphorbia decliviticola appears to be most closely related to *E. graniticola* from the Manica District of Moçambique, some 700 km to the south-west of the distribution of the new species. Both taxa occupy similar habitats on exposed granite slopes but that now described differs from its relative in being essentially caulescent with whorled branches, whereas *E. graniticola* comprises primarily acaulescent shrubs with crowded branches arising from a much reduced multi-angled crown which develops into a cylindric trunk only very gradually. The inflorescence of *E. decliviticola*, while similar in many respects to that of *E. graniticola*, has the cymes randomly arranged with their cyathia often horizontally or obliquely arranged with secondary and tertiary bisexual cyathia fre-

quently developing. The fascicles of male flowers of the new species are subtended internally by a broad, laciniate, finely fimbriate bract and on the outside by a fimbriate toothed, transverse lobe which is almost twice as wide as that of its southerly relative. The slightly smaller, more nearly globose capsule of *E. declivicola* is borne on a somewhat shorter pedicel, and finally these northerly plants flower in midsummer as opposed to the somewhat erratic but normally winter or spring flowering of *E. graniticola*.



FIG. 9.

Euphorbia declivicola Leach

Mr. R. Rutherford-Smith with plant on granite slope, between Namina and Nampula.
Leach & Rutherford-Smith 10976

These differential flowering periods have been retained in cultivation over a number of years; this has resulted in the difficulty experienced in obtaining material adequate for the description of the new species. Heavy rain or hail has so often caused abortion of the immature cyathia, while for three consecutive seasons hail has actually smashed many of the branches of plants grown at Nelspruit in the Easter Transvaal. Somewhat similar conditions possibly obtain in its natural habitat and may account, in part at least, for the paucity of young plants and seedlings seen at either of the known localities.



FIG. 10.

Population of *E. decliviticola* between Namina and Nampula

Juveniles of *E. graniticola* are acaulescent with numerous, crowded, usually spirally twisted branches from a many-angled, much-reduced crown, while those of *E. decliviticola* are produced rather sparingly from an initially 4-angled erect stem which eventually develops into the multi-angled trunk of the species. This trunk remains somewhat angular and is plainly marked by the scars of fallen branches, whereas that of its relative, which is developed very slowly, is relatively smooth and cylindric.

The photograph of a young plant of *E. decliviticola* depicts a juvenile estimated to be 12–15 years old, while that of a shrub of *E. graniticola* is known to be considerably older as this was already a shrub when originally collected some 16 years ago.

Plant a succulent, spiny small tree or tree-like shrub, up to ± 3 m tall, with a stout, eventually multi-angled simple trunk which is clearly marked with rings of scars of the fallen branches and crowned with a head of crowded, verticillately arranged, mostly simple, winged, spiny branches. Branches spreading, arcuate ascending, $\pm 0,6$ m long, constricted into 2,5–15 cm long, mostly oblong segments, generally ± 6 cm thick with 4–6 wing-like angles; the wings 2–2,5 cm broad with a continuous, whitish, horny margin 1,5–3 mm wide. Spines in divergent pairs, more or less horizontally spreading, up to ± 6

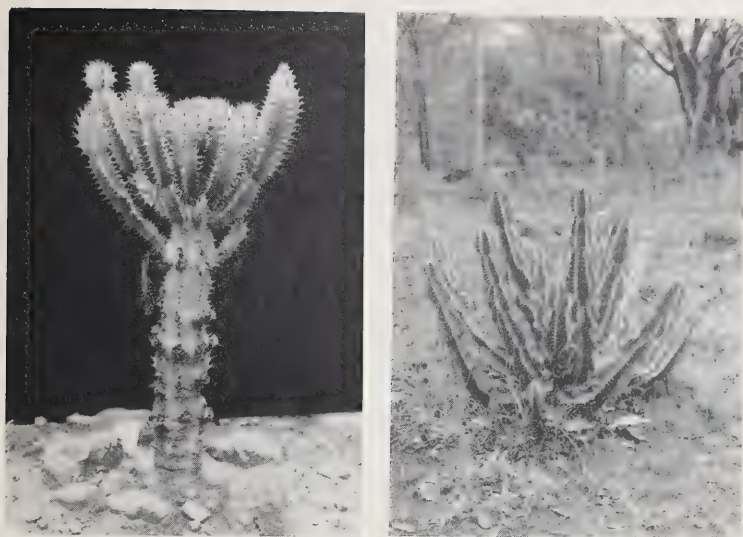


FIG. 11.

E. decliviticola
estimated age 12-15 years.

E. graniticola
age known to be well over 16 years.

A comparison of young plants.

mm long. *Leaves* fleshy, caducous, sessile, ovate or narrowly ovate, acute, up to 7 mm long, with the subcircular or broadly ovate scars soon becoming inconspicuous and the flanking prickles obsolescent. *Inflorescence* cymose, with 1-3 shortly pedunculate, randomly arranged cymes, each initially bearing 3 randomly (often horizontally or obliquely) arranged cyathia, with the sessile initial cyathium male deciduous and the laterals bisexual; these latter often with secondary bisexual cyathia arising from the axils of their bracts and sometimes with further bisexual cyathia repeatedly developing. *Peduncle* bibracteate, ± 2 mm long $\times$ 3 mm thick; *bracts* more or less lunate, but usually split and deteriorated; *cyme branches* ± 2 mm long and thick, with a pair of bracts which are initially more or less ovate with minutely denticulate margins but soon become split and torn as the cyme develops. *Involucre* glabrous, truncate obconic, 2.5-3.25 mm long, usually ± 4.5 -5 mm diam.; with 5 separate or barely contiguous, fleshy, more or less depressed obovate yellow glands, 1.75-2.5 mm $\times$ ± 1 mm, sparingly lightly rugulose on the slightly convex upper surface and with a very narrow smooth margin, and 5 subquadrate or transversely oblong, deeply fimbriate lobes up to 1.75 mm wide. *Male flowers* ± 30 , arranged in 5 fascicles with filiform or filiform lacerate bracteoles, each

fascicle subtended internally by a broad laciniate finely fimbriate bract. *Ovary* subglobose, exerted from the involucre on a curved pedicel; ovule suspended under a very small, slightly 2-lobed obturator; *styles* ± 1 mm long, free almost to the base, spreading, with very shortly bifid apices. *Capsule* obtusely 3-lobed, almost subglobose, 5–5.5 mm diam., 3–3.5 mm high when almost mature; with a pedicel up to 7 mm long and an obtusely triangular or almost subcircular perianth up to 2.5 mm diam. *Seed* globose, ± 2 mm diam., smooth.

***Euphorbia knuthii* Pax**

Subsequent to the rediscovery, in 1961, of *E. johnsonii* N.E.Br. on the Moçambique coast to the north of the Savé River, the author has had the opportunity of investigating a number of localities between Delagoa Bay and Beira, which appeared to be suitable for the occurrence of either *E. knuthii* or *E. johnsonii*. However, no populations, other than those already recorded, have been found in this region, although it seems possible that the intensive shifting agriculture which has taken place, particularly along the southern portions of the littoral, may have caused some elimination.

It was suggested [Kirkia 3: 36 (1963)] that *E. johnsonii* might be best considered as a variety of *E. knuthii*; however, in view of the disjunct and discrete distributions of the two taxa, together with the degree of discontinuity in those characters by which they are distinguished, it seems that subspecific rank is a more correct assessment of the taxonomic situation.

The subspecies appear to differ only in habit and the number of angles to the branches. In subsp. *knuthii* 3–4-angled branches (rarely 5-angled) are produced from a rhizomatous mass of roots, usually with a large main tuber, often with plantlets arising at some little distance from the parent plant; individuals sometimes occupying an area 60 cm or more in diam. Subsp. *johnsonii*, on the other hand, is normally a solitary plant with relatively few 2–3-angled branches (only one plant has been found with 3–4-angled) arising from a single large tuberous root, with only rarely a tendency towards a rhizomatous habit.

Subsp. *knuthii*

Euphorbia knuthii Pax in Bot. Jb 34: 83(1904).—N.E.Br. in Fl. Cap. 5(2): 363(1915).—Phillips in Flow. Pl. S. Afr. 9: t.348(1919).—Burt Davy, Fl. Pl. & Ferns Transv. & Swazil. 2: 296(1932).—White, Dyer & Sloane, Succ. Euphorb. 2: 732(1941).—Jacobsen, Handb. Succ. Pl. 1: 445(1960) et Sukk. Lexikon: 193(1970).

Type: MOÇAMBIQUE, Ressano Garcia, *Schlechter* 11949 (G; PRE;).

The distribution of this subsp. is now known to be rather more extensive than was originally thought. Plants are common and widespread in the Delagoa



FIG. 12.

Plant from Komatipoort with
numerous tuberous roots.

Leach 13112

Plant from "Maputoland" showing
development of rhizomes

Leach & Bayliss 11943

Euphorbia knuthii subsp. *knuthii*



FIG. 13.

Specimen from type locality
showing tendency towards a
rhizomatous habit.

Euphorbia knuthii subsp. *johnsonii* *Leach* 11244

Normal plants from type locality,
with simple tuberous roots.

Bay region of Moçambique, particularly in low-lying, black turf areas. In some of the extensive seasonal vleis between Boane and Catuane, dense populations occur, often in close association with equally large numbers of *Stultitia paradoxa* Verdoorn. Terrain characteristic of this "Maputoland" country extends into northern Zululand and, as is to be expected, subsp. *knuthii* appears to be equally plentiful in that area to as far south as Mkuse. The more inland extension of its distribution appears to be restricted to the Transvaal, where some rather small and scattered colonies are to be found more or less along the Crocodile river valley, to as far west as Kaapmuiden.

Moçambique; LM Lourenço Marques Distr., between Moamba and Guija, *Torre* 6630 (PRE); between Moamba and Magude, *Torre* 7327A (LISC); near Motaze, *Torre* 7209 (LISC); 21 km N of Moamba, 3–5-angled, *Leach & Bayliss* 11749 (K; LISC; PRE; SRGH); Ressano Garcia, fl. 27.xii.1897, *Schlechter* 11949 (G; PRE); near Moamba, *Mendonça* 1550 (LISC), *ibid.* *Torre* 7942 (LISC); between Moamba & Boane, *Torre* 7938 (LISC); between Boane & Marracuene, hort. Lourenço Marques, *E. de Sousa* 80 (LISC; PRE); near Lourenço Marques, *van Balen* s.n. in Nat. Herb. 8030 (PRE), *ibid.* *Bodley* 579 (PRE); near Boane, hort. Nelspruit, fr. Jan. 1963, *Leach & Bayliss* 11029 (BR; G; LMA); between Umbeluzi & Bela Vista, *Pedro* 3125 (LMA); between Umbeluzi & Goba, *Torre* 1848 (LISC); "Maputo", *Barbosa* 583 (LISC); between Boane & Catuane, *Leach & Bayliss* 11943 (SRGH); 22 km N of Catuane, *Leach & Bayliss* 11936 (K; LMA; PRE; SRGH); near Catuane, *Mendonça* 2985 (LISC), *ibid.* *Torre* 1915 (LISC).

S. Africa, TRANSVAAL; 2531 (Komatipoort): Hectorspruit (-BC), hort. Salisbury, fl. & fr. 24.iii.1961, *Leach* 10756 (PRE); Komatipoort (-BD), st. 27.viii.1965, *Leach* 13112 (G; PRE; SRGH), *Van der Merwe* E18 (PRE); Nelspruit Distr., Kruger Nat. Park, fl. Jan. 1953, *Van der Schijff* 1802 (PRE).

NATAL; 2632 (Bela Vista): Ndumu Game Reserve (-CD), 4.xi.1969, *Moll* 4290 (PRE), *Ward* 3115 (PRE). 2732 (Ubombo): Mkuze Br., Candover-Nongoma Rd. (-CA), fl. & fr. 13.xi.1968, *Venter* 5202 (PRE); Ingwavuma Distr., Opondwini Riv. (-A), *Hardy* 1273 (PRE), *Strey* 4657 (PRE); ±29 km from Otoberinti pont on Ingwavuma road, *Edwards* 2926 (PRE).

Swaziland; 2631 (Mbabane) Ubombo Mtns., near Stegi, 8.iii.1935, *Keith* s.n. (PRE).

This specimen probably belongs here although a measure of uncertainty exists as the plant is sterile. However, Capt. Keith is known to have cultivated numbers of indigenous plants in his garden near Stegi and it is suspected that the record may refer to one of these; moreover, despite intensive collecting throughout Swaziland by Professor H. Compton, in addition to the investigation of apparently likely localities by Col. R. D. Bayliss as well as by the author, the species has not again been recorded from the territory.

Subsp. *johnsonii* (N.E.Br.) Leach, stat. nov.

Euphorbia johnsonii N.E.Br. in Fl. Trop. Afr. 6(1): 511(1911).—White, Dyer & Sloane, Succ. Euphorb. 2: 736(1941).—Jacobsen, Handb. Succ. Pl. 1: 444(1960) et Sukk. Lexikon: 192(1970), p.p. excl. distrib. Malawi.—Leach in Kirkia 3: 34(1963).

Type: MOÇAMBIQUE, Manica e Sofala Distr., Cherinda, *W. H. Johnson* s.n. (K).

In contrast to the rather extensive distribution of the typical subsp. that of subsp. *johnsonii* appears to be restricted to a relatively short stretch of the coastal plain between the Savé and Buzi rivers.

Moçambique; MS: Manica e Sofala Distr. between the Buzi and Sofala rivers, near Ampara and Gorongoza Riv., fl. 29.viii.1961, *Leach* 11240 (K; LISC; PRE; SRGH); near Cherinda, fl. 31.viii.1961, *Leach* 11244 (G; K; LMA; PRE; SRGH).

The sketch, by A. F. Gomes e Sousa, of a plant from near Nampula, which White, Dyer & Sloane, l.c., very tentatively suggest may represent *E. johnsonii*, does in fact depict a plant in many ways quite different. The writer has been unable to rediscover plants corresponding to this figure at any locality in N. Moçambique; its identity consequently remains obscure although it appears to have little connection with *E. knuthii*.

E. knuthii was considered by N. E. Brown (Fl. Cap. l.c.) to be related to *E. squarrosa* Harv. and *E. schinzii* Pax. However, although sometimes having a somewhat similar appearance, it is considered that the connection with the latter species is, in fact, rather remote. *E. schinzii* belongs in a numerous and widespread group which includes among its common characteristics: a barely or only very shortly exserted, obtusely lobed capsule and more or less ellipsoid, verrucose seeds; whereas *E. knuthii* appears to find its affinities with such species as *E. squarrosa* and *E. stellata* Willd., in which the more deeply lobed, more acutely angled capsule with its smooth, subglobose seeds is far exserted from the involucre on a long curved pedicel. It seems worthy of note that these characters are shared also, to a greater or lesser extent, by a number of tropical and subtropical species, some of which, e.g. *E. grandidens* Haw., *E. evansii* Pax and *E. confinalis* R. A. Dyer, are found in the same geographical area as *E. knuthii*.

ACKNOWLEDGEMENTS

The author wishes to acknowledge the generous assistance he received in so many directions during the course of his investigations and travels and to record his sincere thanks to:—

Professor B. Binns of Chancellor College, University of Malawi, for her help when visiting Malawi.

Dr. L. E. Codd, for the facilities of the herbarium and library of the Botanical Research Institute, Pretoria (PRE).

The Directors of the herbaria of the Conservatoire botanique, Genève (G); the Royal Botanic Gardens, Kew (K); the Centro de Botânica, Lisbon (LISC); the Divisão de Botânica, I.I.A.M., Lourenço Marques (LMA); and the Division of Forest Research, Kitwe (NDO), for the loan of material.

Mr. R. B. Drummond, Chief Botanist, Branch of Botany, Salisbury (SRGH), for the facilities of the herbarium and with Mr. B. Simon of that institute and Dr. G. Williamson of Lusaka, for living specimens of *E. fanshawei*.

The Royle family of Thyolo (Cholo), for valuable assistance in the field, for collecting fruiting material of *E. mlanjeana* under hazardous conditions and especially for transportation to various localities in Malawi.

Eng. & Senhora F. Sousa de Almeida of Ribauê for all their help, and Prof. E. A. Schelpe and Mr. R. Rutherford-Smith for their companionship and assistance when travelling in northern Moçambique.

Mr. & Mrs. J. A. Whellan, Bvumbwe Research Station, Limbe, for transport when conducting him to the Little Malosa River locality, where with Mrs. M. Rich and John and Michael Royle, living plants and herbarium material of *E. mlanjeana* were collected; also to Mr. Colin Findlay of Lujeri Tea Estate for providing a guide to the Ruo Gorge population.